

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) An apparatus for obtaining coherent scatter imaging data of an examination object comprising:

- a radiation source arrangement for creating a radiation beam of ionizing radiation centered around an axis of symmetry, which radiation beam is directed through said examination object; and

- a radiation detector arrangement comprising a stack of line detector units, each being directed towards a small portion of a trajectory of said radiation beam in said examination object to allow a respective substantially fan-shaped ray bundle of said radiation beam as coherently scattered in said examination object to enter a respective ~~the~~ line detector unit and be detected therein; wherein

- each of said line detector units has an elongated opening for entry of the respective fan-shaped coherently scattered ray bundle; a row of individual detector elements arranged essentially parallel with said elongated opening; and is of the kind wherein charges or photons, generated by interactions between the respective fan-shaped coherently scattered ray bundle and a detection medium within the line detector unit and traveling in a direction essentially perpendicular to the respective fan-shaped coherently scattered ray bundle, are detected by said row of individual detector elements; and

- said line detector units and their respective individual detector elements are formed and oriented so as to allow simultaneous recording of coherent scatter imaging data sufficient to form a plurality of one-dimensional images, each being composed from ~~of~~ radiation as coherently scattered in said examination object in a respective angle; and

- said line detector units are directed towards different positions along the trajectory of said radiation beam in said examination object to allow different fan-shaped ray bundles of said radiation beam as coherently scattered in different small portions of said examination object to

enter said line detector units and be detected therein so that a signal from each of said line detector units is needed to form one of said plurality of one-dimensional images.

2. (Canceled)

3. (Currently Amended) The apparatus of claim 1 wherein

- the row of detector elements of each of said line detector units is essentially orthogonal to a plane, in which said axis of symmetry and said stack of line detector units are located; and

- the detector elements of each of said line detector units are separated, elongated, and directed so their extension lines converge in a respective point in said different small portions, and therefore detect ~~therefore~~ different angular portions of the fan-shaped ray bundle entered into the respective line detector unit so that a signal from each of said line detector units ~~unit~~ is needed to form each of said plurality of one-dimensional images.

4. (Currently Amended) The apparatus of claim 1 wherein said line detector units are directed towards different positions along the trajectory of said radiation beam in said examination object, which directions define angles with respect to said axis of symmetry in a ~~the~~ plane, in which said axis of symmetry and said stack of line detector units are located, which angles have the same magnitude.

5. (Currently Amended) The apparatus of claim 1 wherein said radiation detector arrangement comprises a detector unit arranged in a ~~the~~ path of said radiation beam to measure ~~the~~ transmission through said examination object simultaneously with ~~said~~ simultaneous recording of coherent scatter imaging data.

6. (Original) The apparatus of claim 1 wherein each of said line detector units is a gaseous-based parallel plate detector.

7. (Original) The apparatus of claim 6 wherein each of said line detector units is an avalanche amplification detector.

8. (Currently Amended) The apparatus of claim 1 further comprising a device for moving said radiation source and said radiation detector arrangement relative to said examination object

in a direction in a plane orthogonal to said axis of symmetry, while said line detector units are together adapted to record a plurality of line images of radiation as scattered in said examination object in a plurality of different angles to thereby produce coherent scatter imaging data sufficient to form a plurality of two-dimensional images, each being composed from radiation as coherently scattered in said examination object in a respective angle.

9. (Currently Amended) The apparatus of claim 1 further comprising a device for moving said radiation source and said radiation detector arrangement relative to said examination object in two different directions in a plane orthogonal to said axis of symmetry, while said line detector units are together adapted to record a plurality of line images of radiation as scattered in said examination object in a plurality of different angles to thereby produce coherent scatter imaging data sufficient to form a plurality of three-dimensional images, each being composed from radiation as coherently scattered in said examination object in a respective angle.

10. (Currently Amended) An apparatus for obtaining coherent scatter imaging data of an examination object comprising:

- a radiation source arrangement for creating a radiation beam of ionizing radiation centered around an axis of symmetry, which radiation beam is directed through said examination object; and

- a radiation detector arrangement comprising a stack of line detector units, each being directed towards a small portion of a trajectory of said radiation beam in said examination object to allow a respective substantially fan-shaped ray bundle of said radiation beam as coherently scattered in said examination object to enter a respective line detector unit and be detected therein; wherein

- each of said line detector units has an elongated opening for entry of the respective fan-shaped coherently scattered ray bundle; a row of individual detector elements arranged essentially parallel with said elongated opening; and is of the kind wherein charges or photons, generated by interactions between the respective fan-shaped coherently scattered ray bundle and a detection medium within the respective line detector unit and traveling in a direction essentially

perpendicular to the respective fan-shaped coherently scattered ray bundle, are detected by said row of individual detector elements; and

- said line detector units and their respective individual detector elements are formed and oriented so as to allow simultaneous recording of coherent scatter imaging data sufficient to form a plurality of one-dimensional images, each being composed from radiation as coherently scattered in said examination object in a respective angle; and wherein ~~The apparatus of claim 1~~
~~wherein~~

- said radiation beam of ionizing radiation has a substantially line-shaped cross-section;
- the openings of said line detector units are parallel with the substantially line-shaped cross-section of said radiation beam;
- said line detector units are directed towards the same small portion of the trajectory of said radiation beam in said examination object; and
- the detector elements of each of said line detector units are separated, elongated, and arranged to provide coherent scatter imaging data sufficient to form one of said plurality of one-dimensional images.

11. (Original) The apparatus of claim 10 wherein said line detector units are directed towards the same small portion of the trajectory of said radiation beam in said examination object; which directions define different angles with respect to said axis of symmetry in a plane, in which said axis of symmetry and said stack of line detector units are located.

12. (Currently Amended) The apparatus of claim 10 wherein said radiation detector arrangement comprises a detector unit arranged in the path of said radiation beam to measure the transmission through said examination object simultaneously with ~~said~~ simultaneous recording of coherent scatter imaging data.

13. (Original) The apparatus of claim 10 wherein each of said line detector units is a gaseous-based parallel plate detector.

14. (Original) The apparatus of claim 13 wherein each of said line detector units is an avalanche amplification detector.

15. (Currently Amended) The apparatus of claim 10 further comprising a device for moving said radiation detector arrangement and optionally said radiation source relative to said examination object, while said line detector units are together adapted to record a plurality of line images of radiation as scattered in said examination object in a plurality of different angles to thereby produce coherent scatter imaging data sufficient to form a plurality of images, each being composed from of radiation as coherently scattered in said examination object in a respective angle.

16. (Currently Amended) A method for obtaining coherent scatter imaging data of an examination object comprising the steps of:

- directing a radiation beam of ionizing radiation centered around an axis of symmetry through said examination object; and

- directing each one of a plurality of line detector units arranged in a stack towards a small portion of a ~~the~~ trajectory of said radiation beam in said examination object to allow a respective substantially fan-shaped ray bundle of said radiation beam as coherently scattered in said examination object to enter a ~~respective~~ ~~the~~ line detector unit; and

- detecting said fan-shaped ray bundle entered into said line detector units, wherein

- each of said line detector units has an elongated opening for entry of the respective fan-shaped coherently scattered ray bundle; a row of individual detector elements arranged essentially parallel with said elongated opening; and is of the kind wherein charges or photons, generated by interactions between the respective fan-shaped coherently scattered ray bundle and a detection medium within the line detector unit and traveling in a direction essentially perpendicular to the respective fan-shaped coherently scattered ray bundle, are detected by said row of individual detector elements; and

- said line detector units and their respective individual detector elements are formed and oriented so as to allow simultaneous recording of coherent scatter imaging data sufficient to form

a plurality of one-dimensional images, each being composed from radiation as coherently scattered in said examination object in a respective angle;

- said line detector units are directed towards different positions along the trajectory of said radiation beam in said examination object to allow different fan-shaped ray bundles of said radiation beam as coherently scattered in different small portions of said examination object to enter said line detector units and be detected therein;

- the row of detector elements of each of said line detector units is essentially orthogonal to a plane, in which said axis of symmetry and said stack of line detector units are located; and

- the detector elements of each of said line detector units are separated, elongated, and directed so their extension lines converge in a respective point in said different small portions, and therefore detect different angular portions of the fan-shaped ray bundle entered into the respective line detector unit so that a signal from each of said line detector units is needed to form each of said plurality of one-dimensional images.

17. (Canceled)

18. (Currently Amended) An apparatus for obtaining coherent scatter imaging data of an examination object comprising:

- a radiation source arrangement for creating a collimated radiation beam of ionizing radiation centered around an axis of symmetry, which radiation beam is directed through said examination object; and

- a line detector unit being directed towards a small portion of ~~a the~~ trajectory of said radiation beam in said examination object to allow a substantially fan-shaped ray bundle of said radiation beam as coherently scattered in said examination object to enter the line detector unit and be detected therein; wherein

- said line detector unit has an elongated opening for entry of the fan-shaped coherently scattered ray bundle; a row of individual detector elements arranged essentially parallel with said elongated opening; and is of the kind wherein charges or photons, generated by interactions between the fan-shaped coherently scattered ray bundle and a detection medium within the line

detector unit and traveling in a direction essentially perpendicular to the fan-shaped coherently scattered ray bundle, are detected by said row of individual detector elements;

- the row of detector elements of said line detector unit is essentially orthogonal to said axis of symmetry; and

- the detector elements of said line detector unit are separated, elongated, and directed so their extension lines converge in a single point in said small portion, and therefore detect ~~therefore~~ different angular portions of the fan-shaped ray bundle entered into the line detector unit.

19. (Original) The apparatus of claim 18 wherein said line detector unit is a gaseous-based parallel plate detector.

20. (Currently Amended) The apparatus of claim 19 wherein said line detector units ~~unit~~ is an avalanche amplification detector.

21. (New) A method for obtaining coherent scatter imaging data of an examination object comprising the steps of:

- directing a radiation beam of ionizing radiation centered around an axis of symmetry through said examination object; and

- directing each one of a plurality of line detector units arranged in a stack towards a small portion of a trajectory of said radiation beam in said examination object to allow a respective substantially fan-shaped ray bundle of said radiation beam as coherently scattered in said examination object; and

- detecting said fan-shaped ray bundle entered into a respective line detector unit, wherein

- each of said line detector units has an elongated opening for entry of the respective fan-shaped coherently scattered ray bundle; a row of individual detector elements arranged essentially parallel with said elongated opening; and is of the kind wherein charges or photons, generated by interactions between the respective fan-shaped coherently scattered ray bundle and a detection medium within the respective line detector unit and traveling in a direction essentially

perpendicular to the respective fan-shaped coherently scattered ray bundle, are detected by said row of individual detector elements; and

- said line detector units and their respective individual detector elements are formed and oriented so as to allow simultaneous recording of coherent scatter imaging data sufficient to form a plurality of one-dimensional images, each being composed from radiation as coherently scattered in said examination object in a respective angle; and wherein

- said radiation beam of ionizing radiation has a substantially line-shaped cross-section;

- the openings of said line detector units are parallel with the substantially line-shaped cross-section of said radiation beam;

- said line detector units are directed towards the same small portion of the trajectory of said radiation beam in said examination object; and

- the detector elements of each of said line detector units are separated, elongated, and arranged to provide coherent scatter imaging data sufficient to form one of said plurality of one-dimensional images.